



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,414	08/04/2003	Chih-Kun Chen	2019-0207P	2565
2292	7590	11/29/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH			MILLER, ROSE MARY	
PO BOX 747			ART UNIT	
FALLS CHURCH, VA 22040-0747			PAPER NUMBER	
			2856	

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,414

Applicant(s)

CHEN ET AL.

Examiner

Rose M Miller

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-7 and 9-12 is/are rejected.
- 7) ☒ Claim(s) 2,4 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 6 objected to because of the following informalities: it is unclear what the phrase "transmitting a begging or an end message" to the microprocessor means. The phrase has been taken to mean transmitting a beginning or end message to the microprocessor means. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by **Takisha et al. (US 4,768,155)**.

Takisha et al. discloses an apparatus for detecting flaws in a semiconductor substrate comprising a detection platform (8) holding the substrate thereon for detecting; a cross-bar ultrasonic (supersonic) detection device (see Figure 1) positioned above said detection platform (8) for emitting and receiving an ultrasonic (supersonic) wave reflected by the substrate; and a microprocessor ((32, 32a, 32b) for processing said reflected ultrasonic (supersonic) and transmitting to a monitor (34) whereby detecting flaws in said substrate. While **Takisha et al.** does not specifically state that it is for testing wafers, it is inherent in the system provided that **Takisha et al.** test wafers as **Takisha et al.** clearly indicates at lines 11-15 of column 1 testing semiconductors for internal flaws.

With regards to claim 5, **Takisha et al.** clearly indicates the ultrasonic detection device (see Figure 1) having a transducer (probe 4) positioned above said detection platform (8, see Figure 1), and a pair of supporting portions connected with two ends of the transducer (4, scanning device 6 has both stationary guides 10a, 10b and movable

Art Unit: 2856

guide 12 which cooperate with motors 16a and 16b to scan the transducer over the substrate, see column 4 lines 15-45), and said transducer (4) having an emitting portion and a receiving portion (probe 4 operates in a pitch/catch mode where the probe alternates as a pulser/transmitter and a receiver, this inherently meets the requirements of having an emitting portion and a receiving portion mounted therein).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Takisha et al.** in view of **Gilmore et al. (US 4,366,703)**.

Takisha et al. discloses the claimed invention with the exception of the detection platform comprising a chamber-module detection platform having a pad for carrying said wafer, and a table for carrying said pad.

Gilmore et al. discloses using a pallet (32, see column 4 lines 1-21) to fasten the test piece to in order to move the test piece between the ultrasonic transmitter and

Art Unit: 2856

receiver, the pallet (32) being supported by a support member inside the container enclosing the testing apparatus (see column 4 lines 15-21).

While **Takisha et al.** does disclose using a chamber (container) for enclosing the liquid surrounding the substrate under test (see column 4 lines 11-12) and using an X-Y stage for the supporting plate (8) (see column 4, lines 42-45), **Takisha et al.** does not specifically teach a pad for carrying the wafer with the pad being on a table.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Takisha et al.** with a pad for carrying the wafer, the pad being supported or mounted on a table, as **Gilmore et al.** teaches the advantages in the art of being able to move the test piece on a pad (pallet 32) which is supported by a table or other means.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Takisha et al.** in view of **Chang et al. (US 6,062,084)**.

Takisha et al. discloses the claimed invention with the exception of the system comprising a sensor mounted in the transducer or the supporting portions for sensing an incoming and outgoing of said wafer and transmitting a begging or an end message to the microprocessor.

Chang et al. teaches that it is known to determine the position and orientation of a wafer under test before starting to perform the test, and communicating such information to the microprocessor controlling the test, in order to facilitate a mapping of the defects or faults on the wafer under test.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Takisha et al.** with a sensor for determining the position (incoming and outgoing) of the wafer under test and communicating such information to the microprocessor in order to facilitate the mapping of the defects found within the test subject as **Chang et al.** clearly teaches that such detection and the communication of the detection allows for a more complete testing of the wafer being inspected. As for mounting the sensor with the transducer or on the

Art Unit: 2856

supporting portions, one of ordinary skill in the art would be able to easily determine the location for the sensor such that the best sensing could be performed.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Takisha et al.**

While **Takisha et al.** does not specifically disclose using an ultrasonic (supersonic) wave with a frequency of between one hundred million and five thousand million hertz (100 MHz to 5 GHz), it would have been obvious to one of ordinary skill in the art to utilize such a frequency as the frequency of the ultrasound transducer is determined by the ultrasound transducer itself and its peak operating frequency. One of ordinary skill in the art would also know that the higher frequency ultrasound waves would more easily determine defects or flaws within the thin wafer crystal under test. Therefore, one of ordinary skill in the art would easily determine the operating frequency of the ultrasonic transducer which provides the best test results for the environment in which the system is to be operated.

Furthermore, it has been held by the courts that the use of routine experimentation to determine optimum ranges and preferred materials is not a patentable invention. Please see In re Aller, 105 USPQ 233 (CCPA 1955), In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), and In re Leshin, 125 USPQ 416 (CCPA 1960).

9. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Takisha et al.** in view of **Chang et al.**

Takisha et al. discloses the claimed invention with the exception of the method including a step of providing a sensor for inspecting if said wafer is transferred to an end thereof for controlling a detecting sequence.

Chang et al. teaches that it is known to determine the position and orientation of a wafer under test before starting to perform the test, and communicating such information to the microprocessor controlling the test, in order to facilitate a mapping of the defects or faults on the wafer under test.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Takisha et al.** with a sensor for determining the position (incoming and outgoing) of the wafer under test and communicating such information to the microprocessor in order to facilitate the mapping of the defects found within the test subject as **Chang et al.** clearly teaches that such detection and the communication of the detection allows for a more complete testing of the wafer being inspected.

As for claim 10, **Takisha et al.** discloses indicating the presence a flaw in the substrate by placing a visual indication of the flaw on the monitor (34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system with an audio indication of the determination of a defect, such as the claimed beep, instead of, or in addition to, the visual indication of the defect now provided as both are well recognized in the art of measuring and testing as being viable means for indicating to the operator of the test that a defect has been found or that an error has incurred during the testing which needs the operator's attention. Both visual and audio indications of test results and problems with a test are well known, especially with the introduction of computers which allows for almost constant attention to the test while the operator can be performing other necessary tasks.

As for claim 11, **Takisha et al.** clearly indicates the ultrasonic detection device (see Figure 1) having a transducer (probe 4) positioned above said test object (8, see Figure 1).

As for claim 12, **Takisha et al.** clearly indicates the ultrasonic detection device (see Figure 1) having a transducer (probe 4) with an emitting portion and a receiving portion (probe 4 operates in a pitch/catch mode where the probe alternates as a pulser/transmitter and a receiver, this inherently meets the requirements of having an emitting portion and a receiving portion mounted therein).

Art Unit: 2856

Allowable Subject Matter

10. Claims 2, 4, and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rehwald (US 4,741,212) discloses a method for determining structural defects in semiconductor wafers by ultrasonic microscopy.

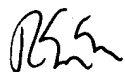
Hagen et al. (US 6,356,346 B1) discloses a device and method for inspecting a disk for physical defects.

Karasawa et al. (US 2004/0024320 A1) discloses an ultrasonograph, ultrasonic transducer, examining instrument and ultrasonographing device.

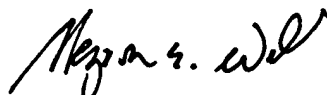
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Thursday, 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



RMM
19 November 2004



HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800